

A revision of the clearwing moth species described by Zukowsky from China with additional notes on Sesiidae species from the Mell collection (Sesiidae)

AXEL KALLIES

The Walter and Eliza Hall Institute of Medical Research, 1G Royal Parade, Melbourne/Parkville, Victoria 3050, Australia; e-mail: kallies@wehi.edu.au

Abstract. In the present paper the Chinese Sesiidae species described by Zukowsky from the Mell collection are reviewed. The following new combinations are introduced: *Glossosphécia melli* (Zukowsky, 1929) comb. n., *Nokona semidiaphana* (Zukowsky, 1929) comb. n., and *Adixoa leucocyanea* (Zukowsky, 1929) comb. n. *Aegeria sangaica* Zukowsky, 1932 is formally established as a synonym of *Toleria abiaeformis* Walker, 1865. Additional Sesiidae records published by Zukowsky (1929) from China are critically analyzed and mostly rejected as the specimens on which these records were based were found to be misidentified. *Melittia inouei* (Arita & Yata, 1987) and *Macroscotelesia japona* (Hampson, 1919) are new records for the fauna of China.

Introduction

Examining the Sesiidae collection of the Zoological Museum of the Humboldt University, Berlin, Germany, the author came across a series of clearwing moth specimens, which had not been incorporated into the main collection. The majority of these moths carried only numbers for labels, but some of them had additional hand-written determination labels, which identified them as taxa described by Zukowsky (1929) from southern China. Comparing these specimens and their labels with the published descriptions and the handwriting of Zukowsky, confirmed that these specimens were holotypes of the taxa in question.

In his paper on the clearwing moth species of the Mell collection from southern China Zukowsky (1929) named three species, *Aegeria melli*, *Paranthrene semidiaphana* and *Synanthedon leucocyanea*, and published records of an additional 19 species. Although some specimens listed in the paper are missing from the collection, most of them could be recovered and assigned to records published by Zukowsky (1929). Examination of the specimens revealed, that Zukowsky's taxa are valid species but have to be transferred to other genera. Most of the additional specimens, however, were misidentified and consequently the majority of Zukowsky's faunistic records, some of which were subsequently cited by other researchers (Gaede 1933; Xu & Liu 1993), are rejected here. In addition to the above mentioned type material, another badly damaged specimen could be identified as a type specimen of a further taxon named by Zukowsky, *Aegeria sangaica* Zukowsky, 1932. This taxon is here confirmed to be a synonym of *Toleria abiaeformis* Walker, 1865.

Material and Methods

All material is located in the Zoological Museum of the Humboldt University, Berlin, Germany (ZMHB). Locality data are quoted as on the labels. When original labels

were absent locality data are given in square brackets, [...], according to Zukowsky (1929); new transcriptions of locality data, if available, are provided in round brackets, (...). The following abbreviations were used: ATA – Anterior Transparent Area; ETA – Exterior Transparent Area; PTA – Posterior Transparent Area.

Taxa described by Zukowsky from China

CISSUVORINI

Glossosphecia melli (Zukowsky) comb. n.

(Figs 1, 5)

Aegeria melli Zukowsky, 1929: 34. Type locality: South China, Sin hang.

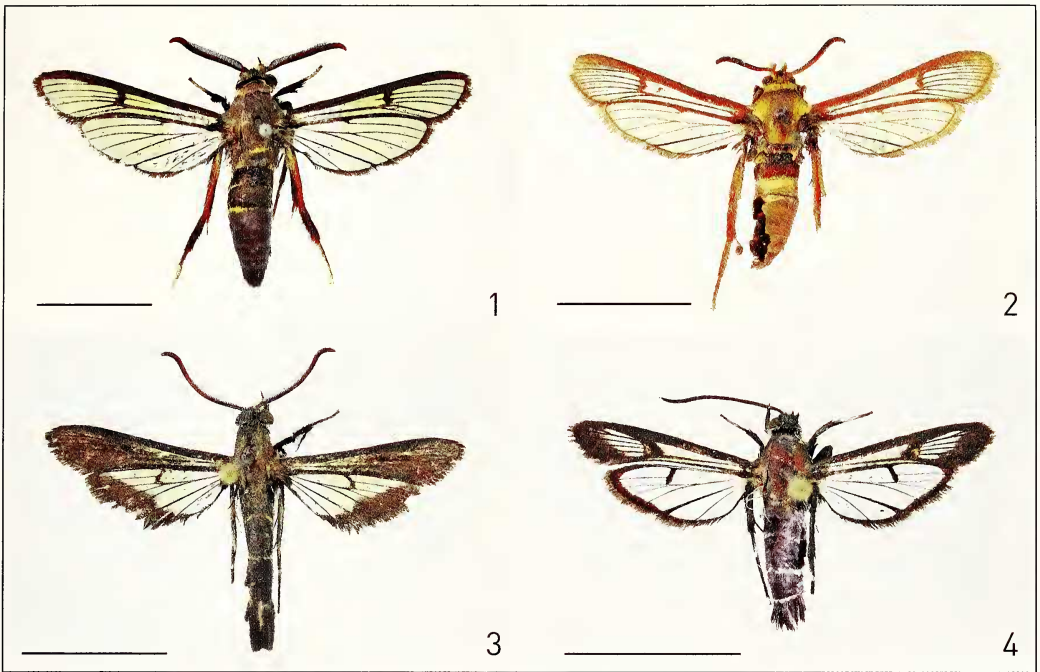
Gaede 1933: 787. Heppner & Duckworth 1981: 32 (*Synanthedon*). Pühringer & Kallies 2004: 29 (*Synanthedon*).

Material. Holotype ♂ [Sin hang] „11. *Aeg. melli*“ / „11.“, gen. prep. AK156.

This species is a typical representative of the genus *Glossosphecia* Hampson 1919. This genus was redefined by Arita & Gorbunov (1998) and besides the species dealt with here it comprises four species, *Glossosphecia contaminata* (Butler, 1878) (the type species), *Glossosphecia romanovi* (Leech, 1889), *Glossosphecia sherpa* (Bartsch, 2003) and *Glossosphecia huoshanensis* (Xu, 1993). *G. melli* seems to be closely related to *G. contaminata*. It differs from the latter by the dark fuscous patagia (bright yellow in *contaminata*) and the abdomen (tergite 4 with a broad and bright yellow band in *contaminata*). *G. huoshanensis* was described from the southern Chinese Huoshan County, Anhui Prov. (Xu 1993) and is possibly a junior synonym of *G. melli*.

Description. Alar expanse 38 mm. Forewing length 16.5 mm. Body length 19 mm. Head. Frons light grey, laterally white; vertex fuscous with fine white scales subdorsally; antenna brown, ventrally orange, unipectinate, ciliate; labial palps with basal segment fuscous, second segment deep yellow with a brown lateral line, apical segment orange-yellow; scapus brown. Legs. Fore coxa yellow with brown margins; fore femur and tibia dark brown, dorsally with long scales, ventrally deep orange; fore tarsus orange; mid and hind coxae yellow; mid and hind femurs yellow in distal portion; mid and hind tibiae ventrally black with yellow patches close to spurs, dorsally dirty orange; basal hind tarsomers with long and rough scaling, dorsally brown-orange, remainder of hind tarsus brown, ventrally yellow-orange. Forewing. Transparent with a rusty shine; discal spot narrow, with a long and narrow projection into ATA; costal margin and discal spot with individual orange scales; ETA with 6 cells, partly covered with minute, semitransparent scales; apical area not developed. Hindwing. Discal spot very small; transparent cells in distal portion of the wing with minute, semitransparent scales. Abdomen. Dark fuscous, tergites 1–3 with narrow yellow posterior margins, tergite 4 with yellow scales at anterior margin, sternites 2–7 with pale yellow posterior margins, anal tuft fuscous, apically pale yellow.

Distribution. The position of the type locality could not be verified. It is likely to be a place in the Guangdong Province where most of Mell's material was collected.



Figs 1–4. Sesiidae types from the Mell collection (all in MNHB). **1.** *Glossosphecia melli* comb. n., holotype, male. **2.** *Toleria abiaeformis*, female (syntype of *Aegeria sangaica*). **3.** *Nokona semidiaphana* comb. n., holotype, male. **4.** *Adixoa leucocyanea* comb. n., holotype, female. Scale bars 10 mm.

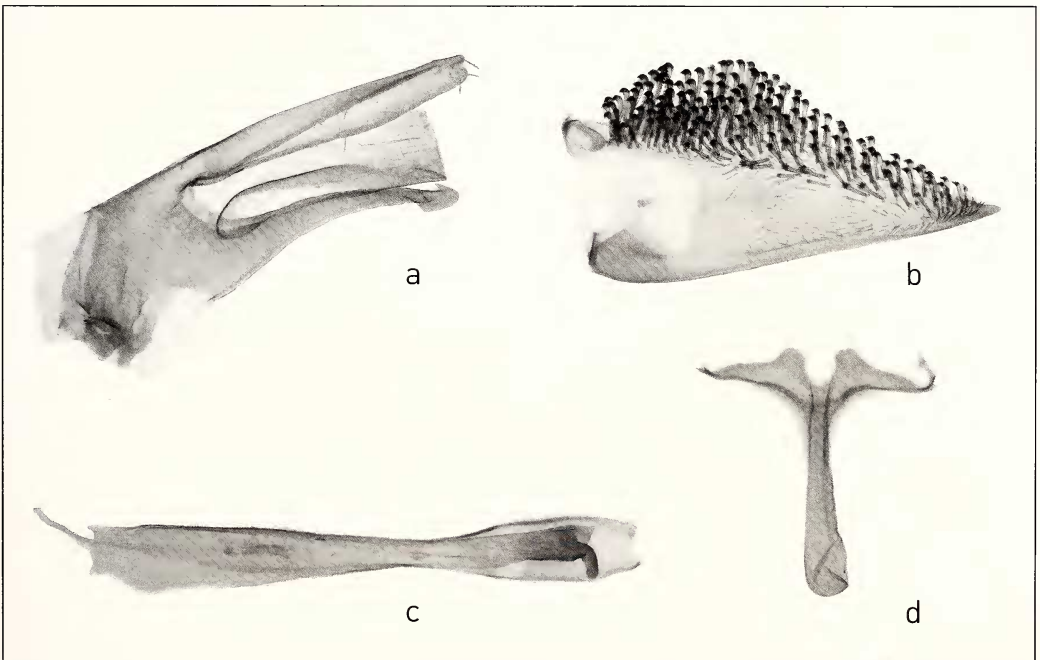


Fig. 5. *Glossosphecia melli*, holotype, male genitalia. **a.** uncus-tegumen, lateral. **b.** right valva, ventral. **c.** phallus, lateral. **d.** saccus, ventral.

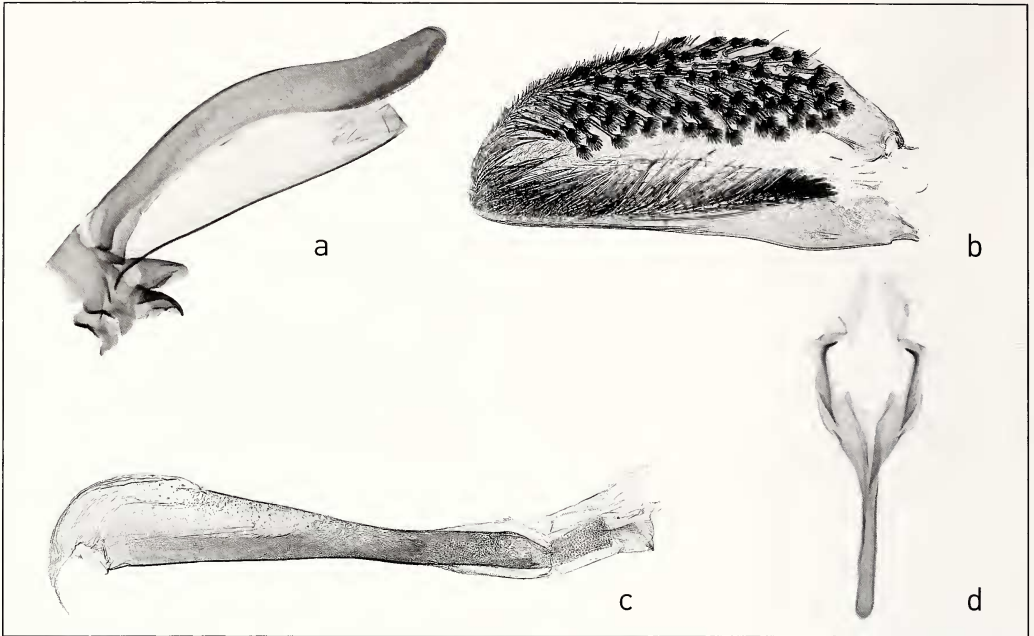


Fig. 6. *Nokona semidiaphana*, holotype, male genitalia. **a.** uncus-tegumen, lateral. **b.** left valva, ventral. **c.** phallus, lateral. **d.** saccus, ventral.

Habitat and Bionomics. Unknown; the specimen was collected ‘on a leaf in a forest’ (Zukowsky 1929).

Remarks. Generic combinations of some of the above mentioned species were established during the course of this work but have been formally published earlier (Pühringer & Kallies 2004).

Toleria abiaeformis Walker, 1865

(Fig. 2)

= *Aegeria sangaica* Zukowsky, 1932: 316. Type locality: Shanghai.

Heppner & Duckworth 1981: 28 (Sesia). Špatenka et al. 1999: 115. Pühringer & Kallies 2004: 12.

Material. 1♂ (syntype, Fig. 2). “Shanghai (China), Juni 1918., (H. Höne)” / “det. Zukowsky” / “Type, H. Höne, 11.1.19, *Aegeria sangaica* Höne?”

Aegeria sangaica Zukowsky, 1932 and *Sphecia sinensis* Walker, 1865 were both considered synonyms of *Toleria abiaeformis* Walker, 1865 although the type material of Zukowsky’s taxon had not been traced (Špatenka et al. 1999). Arita & Gorbunov (1998) resurrected *sinensis* from synonymy and assigned it to the re-established generic name *Chimaerosphecia* Strand, 1916; however, without establishing the identity of *Aegeria sangaica*. Examination of a syntype of *sangaica* confirms that this taxon is a junior subjective synonym of *Toleria abiaeformis*.

The genus *Toleria* in the present view contains only two valid species, *T. abiaeformis* and the very similar *T. ilana* Arita & Gorbunov, 2001. The structures of the female genitalia are only insufficiently known. The genus *Chimaerosphecia* Strand, 1916 on the other hand is known from females only. It was redefined and separated from *Toleria*

Walker, 1865 by Arita & Gorbunov (1998) on the grounds of small differences in the venation and labial palpus. Apart from the type species, *Ch. aegerides* Strand, 1916, from Taiwan, it contains another two species, *Ch. sinensis* Walker, 1865 from Hong Kong and *Ch. colochelyna* Bryk, 1947 from Kiangsu, Southern China. The validity of the genus *Chimaerosphecia* is considered doubtful by the present author and more material, in particular clearly conspecific males and females, is needed to establish the identity of the genus.

Remarks. Zukowsky (1932) mentioned three type specimens from the Höne collection (today in Zoologisches Forschungsinstitut und Museum Alexander König, Bonn, Germany), all from Shanghai, one of which was found in the ZMHB. This specimen consequently is a syntype. The designation of the lectotype is avoided here as the present specimen is badly damaged by frass with major parts of the genitalia destroyed. If additional syntypes can be found in other parts of the Höne collection one should be selected as lectotype. The biology of the species of *Toleria* is not known; however, the larvae of a species of the closely related genus *Chimaerosphecia*, *Ch. sinensis*, were collected in the trunks of *Ormosia pachycarpa* (Fabaceae) at Ma On Chan, Hong Kong, in May and adults emerged in early June (Kendrick 2001).

PARANTHRENINI

Nokona semidiaphana (Zukowsky) comb. n.

(Figs 3, 6, 7)

Paranthrene semidiaphana Zukowsky, 1929: 36. Type locality: Mahn tsi shan.

Gaede 1933: 794. Heppner & Duckworth 1981: 24. Liu & Shen 1992: 728. Pühringer & Kallies 2004: 21.

Material. Holotype ♂ “24. *P. semidiaphana*” / “24” [Mahn tsi shan 25.vii.1915] (Guangdon Prov, E Nanling, between rivers Si Kiang and Yangste), gen. prep. AK157. Additional material: 1♂ „China Canton, 9.1910, Mell S.V.“; 1♀ [Mahn tsi shan, 900 m, 31.vii.1915]; 1♀ [Lin-ping, 700 m, NO Kwangtung, 14.vii.1920].

This species is a typical representative of the genus *Nokona* Matsumura, 1931. It differs from most congeners by the conspicuously broad and dark margins of the hindwings. Broadened hindwing margins are known from some other species of *Nokona* such as *N. powondrae* (Dalla Torre, 1925) and *N. inexpectata* Arita & Gorbunov, 2001, both from Taiwan. These species, however, have distinctly different markings on the abdomen (comp. Arita & Gorbunov 2001) and significantly different genitalia (valva long and tapered, saccus short in the species compared; valva shorter, saccus long and narrow in *N. semidiaphana*).

Apart from the holotype of this species, the Mell collection contains an additional three specimens, which are here considered as belonging to *N. semidiaphana*. These specimens were misidentified by Zukowsky (1929) as *Paranthrene davidi* Le Cerf, 1917 and *Paranthrene cupreivitta* (Hampson, 1893), respectively.

Description. Alar expanse 29 mm. Forewing length 13 mm. Body length 17 mm. Head. Frons black, laterally white to grey; labial palpus black, yellow ventrally and medially; vertex black; pericephalic scales white. Thorax. Black; with a yellow patch below forewings; patagia with individual yellow scales laterally. Legs. Fore leg black;

mid coxa black (remaining parts of mid leg broken off); hind coxa yellow; hind femur with posterior margin white; hind tibia black with white lateral patch, yellow at posterior end, medially mainly white; hind tarsus black, basal tarsomer white at distal end. Forewing. Almost entirely opaque brown. Hindwing. Transparent, with a broad brown margin. Abdomen. Black, tergite 1 with individual yellow scales at posterior margin; tergites 2 and 4 with narrow yellow posterior margins; in tergite 4 broadened towards lateral; sternite 4 broad yellow in posterior half; anal tuft triangular, black, ventro-medial with some yellow scales; outer surface of valvae with white scales.

Distribution. Known from the Guangdong Province, China.

Habitat and Bionomics. Most records are from July, one specimen was collected in September.

Adixoa leucocyanea (Zukowsky) comb. n.

(Figs 4, 6)

Synanthedon leucocyanea Zukowsky, 1929: 36. Type locality: Lung tao shan.

Gaede 1933: 781. Heppner & Duckworth 1981: 31. Pühringer & Kallies 2004: 29.

Material. 1♀ (holotype) "29. *S. leucocyanea*" / "29." [Lung tao shan, 19.vii.1917] (Guangdong Prov., Mt. Longtou, ca 230 km N Guangzhou), gen. prep. AK191.

This species belongs to the tribe Paranthrenini and is here assigned to the genus *Adixoa* Hampson, 1893. This association, however, remains tentative until more material, in particular males, is known. The genus *Adixoa* is insufficiently known. So far only the male of *Adixoa trizonata* (Hampson, 1900) has been examined in detail (Gorbunov & Arita 1995). The female genitalia of *A. leucocyanea* are unique amongst the Sesiidae in their formation of the ostium bursae and the most distal parts of the ductus (strongly sclerotized, curved and protruding from the sclerite). This structure distinguishes *A. leucocyanea* readily from all other known Paranthrenini and may prove to be an autapomorphy of the genus *Adixoa*. Habitually *A. leucocyanea* differs from other known species of *Adixoa* by the coloration of the abdomen (black, with white markings; with yellow markings in all other species).

Description. Alar expanse 24 mm. Forewing length 10 mm. Body length 10.5 mm. Head. Frons light grey, laterally white; labial palps grey, ventrally with some white scales, relatively long and upcurved, almost reaching the scapus; vertex black, antenna black, scapus white ventrally; pericephalic scales black, laterally white. Thorax. Black; patagia crème laterally. Legs. Fore coxa crème, basally with a white spot, distally black; fore leg black, dorsally partly white; basal tarsomer with a white distal margin; mid and hind tibiae with a white spot ventrally; spurs black, medial side white; basal and subbasal tarsomers distally white. Forewing. With well-developed transparent areas; discal spot broad, near the cubitus protruding into the ATA, with yellow scales in distal portion; ETA consisting of 5 large cells and an additional small cell between R4 and R5; PTA reaching the discal spot, with some yellow scales in distal portion; apical area almost as wide as ETA. Hindwing. Discal spot well-developed, relatively broad and straight; outer margin well-developed, about as broad as the fringe. Black; tergites 2, 4, 6 each with a narrow white distal band; sternite 1 white in distal half; sternite 3 with a

narrow, sternites 4 and 5 with broad white distal bands; sternite 6 with only some white scales; anal tuft black, with white scales dorso-laterally.

Distribution. Known only from the Guangdong Province, China.

Habitat and Bionomics. Unknown. The type specimen was found ‘on a leaf in a forest, in July’ (Zukowsky 1929).

Additional Sesiidae records from the Mell collection

The following species were identified from the material of the Mell collection.

***Trichocerota melli* Kallies & Arita, 2001**

Material. 1♂, 1♀ „Canton (China), Westfluss, Ting-Wu-San, 28.vi.1910, Mell S.G.” (Guangdong Prov.).

Two specimens in the Mell collection were misidentified as *Trichocertota brachythyra* Hampson, 1919 (Zukowsky 1929); later these specimens became part of the type series of *T. melli* (comp. Kallies & Arita 2001).

***Trichocerota tricolor* Kallies & Arita, 2001**

Material. 1♂, 1♀ [Tsha yuen shan, 19.v.1915].

Two specimens in the Mell collection were misidentified as *Trichocerota dizona* Hampson, 1919 (Zukowsky 1929); later these specimens became paratypes of *T. tricolor* (comp. Kallies & Arita 2001).

***Caudicornia tonkinensis* Kallies & Arita, 2001**

Three specimens of this species in the Mell collection, marked only with “22”, could not be assigned to any published records. Presumably these specimens were collected by Mell in southern China.

***Melittia inouei* (Arita & Yata, 1987)**

Material. 1♂ [South China, Gao fung, 9.vi.1917, leg. Mell], gen. prep. AK188.

This species has been known only from Japan and Korea (Špatenka et al. 1999; Arita et al. 2004) and thus, the specimen listed here represents a new record for China. The specimen in the Mell collection was misidentified as “*M. bombyliiformis* Cramer” (Zukowsky 1929). The exact position of the collecting locality could not be established.

***Macrosclesia japona* (Hampson, 1919)**

Material. 1♀ [South China, Gao fung, 9.vi.1917, leg. Mell], gen. prep. AK184.

This species was known only from Japan and Korea (Špatenka et al. 1999; Arita et al. 2004). The specimen in the Mell collection was identified by Zukowsky (1929) correctly as *M. eurytion* sensu Bartel, 1912 (= *japona* Hampson, 1919). A second specimen, supposedly a male, mentioned by Zukowsky (1929) was not found in the collection. The exact position of the collection locality could not be established.

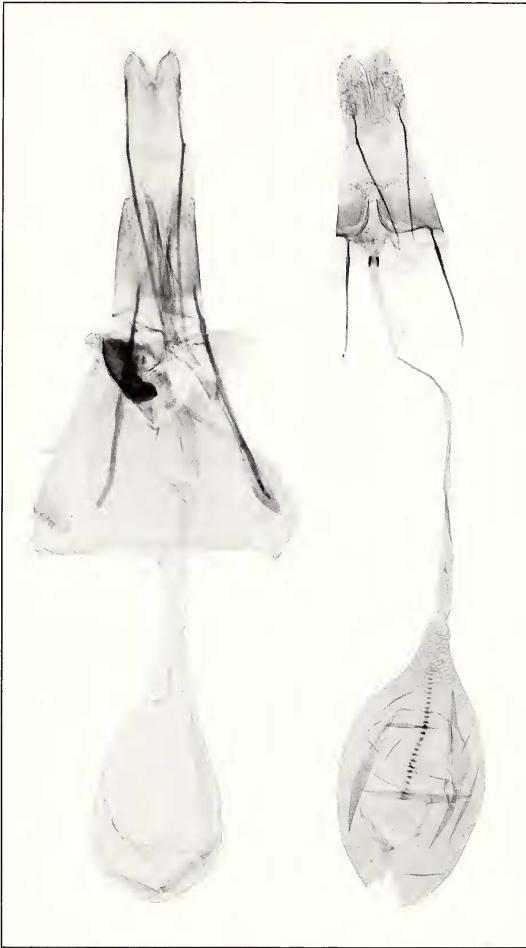


Fig. 7. Female genitalia. **a.** *Adixoa leucocyanea*, holotype. **b.** *Nokona semidiaphana* (?).

***Cyanosesia tonkinensis* Gorbunov & Arita, 1995**

Material. 1♂ [China, Shui yün shan, 2.vi.1917, coll. Mell] (probably Guangdong Province, Shaoguang City, Ongyuen County, 18 km ENE of Fongwan, 900 m, mountain forest), gen. prep. AK187.

This specimen was misidentified by Zukowsky (1929) as *Paranthrene trizonata* Hampson, 1900 but its identity was established as *Cyanosesia tonkinensis* later (Kallies 2003).

***Nokona iridina* (Bryk, 1947)**

Material. 1♀ [Kanton]; 1♀ „Canton (China), Westfluss, Ting-Wu-San, Mell S.G.“; 1M [Lung tao shan, 3.v.1918].

The specimens in the Mell collection were misidentified by Zukowsky (1929) as *Paranthrene bicincta* and *Paranthrene pernix*, respectively. Here they are regarded as *N. iridina* although the status of this taxon in respect to *Nokona bicincta* (Walker, 1865) needs validation. Gorbunov & Arita (2001) regarded *iridina* a distinct species while Špatenka et al. (1999) considered it a synonym of *bicincta*.

***Nokona regale* (Butler, 1878)**

Material. 1♀ [Lung tao shan].

The single specimen present in the Mell collection was correctly identified as *Paranthrene regale* (Zukowsky 1929).

Appendix

Zukowsky (1929) recorded a number of Sesiidae taxa as new for the Chinese fauna. Many of these records, however, have to be considered doubtful with respect to the known distribution of the species concerned. The true identity of some specimens present in the collection, as listed above, could be established here, but others were found to represent unnamed species or their identity remains elusive due to the poor

condition of the material. On the grounds of lacking material, records of the following species as given by Zukowsky (1929) are here rejected: *Paranthrenopsis polishana* (Strand, 1916); *Trichocerota brachythyra* Hampson, 1919; *Trichocerota cupreipennis* (Walker, 1865); *Oligophlebia cristata* Le Cerf, 1916; *Toleria abiaeformis* Walker, 1865; *M. chalciformis* (Fabricius, 1793) (as “*M. bombylififormis* Cramer”); *Nokona bicincta* Walker, 1865 (as *Paranthrene*); *Nokona pernix* (Leech, 1889) (as *Paranthrene*); *Nokona davidi* (Le Cerf, 1917) (as *Paranthrene*); *Paranthrene cupreivitta* (Hampson, 1893); *Adixoa trizonata* (Hampson, 1900) (as *Paranthrene*); *Pseudosesia limpida* (Le Cerf, 1916) (as *Paranthrene*); *Ichneumenoptera auripes* Hampson, 1893; *Synanthedon subauratus* Le Cerf, 1916, *Synanthedon unocingulata* Bartel, 1912; *Synanthedon concavifascia* Le Cerf, 1916.

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